A NEW BIRD-FLEA FROM TASMANIA.

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(*Communicated by Mr. D. J. Lee.*)

(Ten Text-figures.)

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Synopsis.

Three specimens of a new species of *Hoogstraalia*, a Pygiopsyllid genus of bird-fleas, were found in the collection of the late Dr. E. W. Ferguson; they had been bred from a nest of the Tasmanian Scrub-tit, and the new species which they represent is described here in comparison with the hitherto only known member of the genus, *Hoogstraalia turdella* Traub.

Introduction.

When recently sorting out an accumulation of various documents relating to fleas, in the Tring Museum, we found an envelope which contained several photographs of a peculiar male flea, and on the outside of the envelope was a note (obviously written a good many years ago) that the photographs had been received from Dr. E. W. Ferguson of Sydney. Since Dr. Ferguson's active work on Australian fleas took place mainly in the early twenties of this century, it seems probable that the photographs may have been taken about 35 years ago. On examining the photographs I saw, to my amazement, that the flea represented an undescribed species of the Pygiopsyllid genus *Hoogstraalia*, erected by Traub in 1951 for his new species *H. turdella*, known only from the male holotype, collected from a thrush in the Philippines.

Following advice kindly given me by Dr. G. M. Dunnet, I wrote to Mr. D. J. Lee at the School of Public Health and Tropical Medicine in Sydney and asked him whether he would try to trace the photographed specimen. Mr. Lee responded generously to my request and I am most deeply indebted to him, not only for discovering the flea in question but also for finding in Ferguson's collection a male and a female of the same species with the same data, and for obtaining permission to send me the three specimens on loan for study and description.

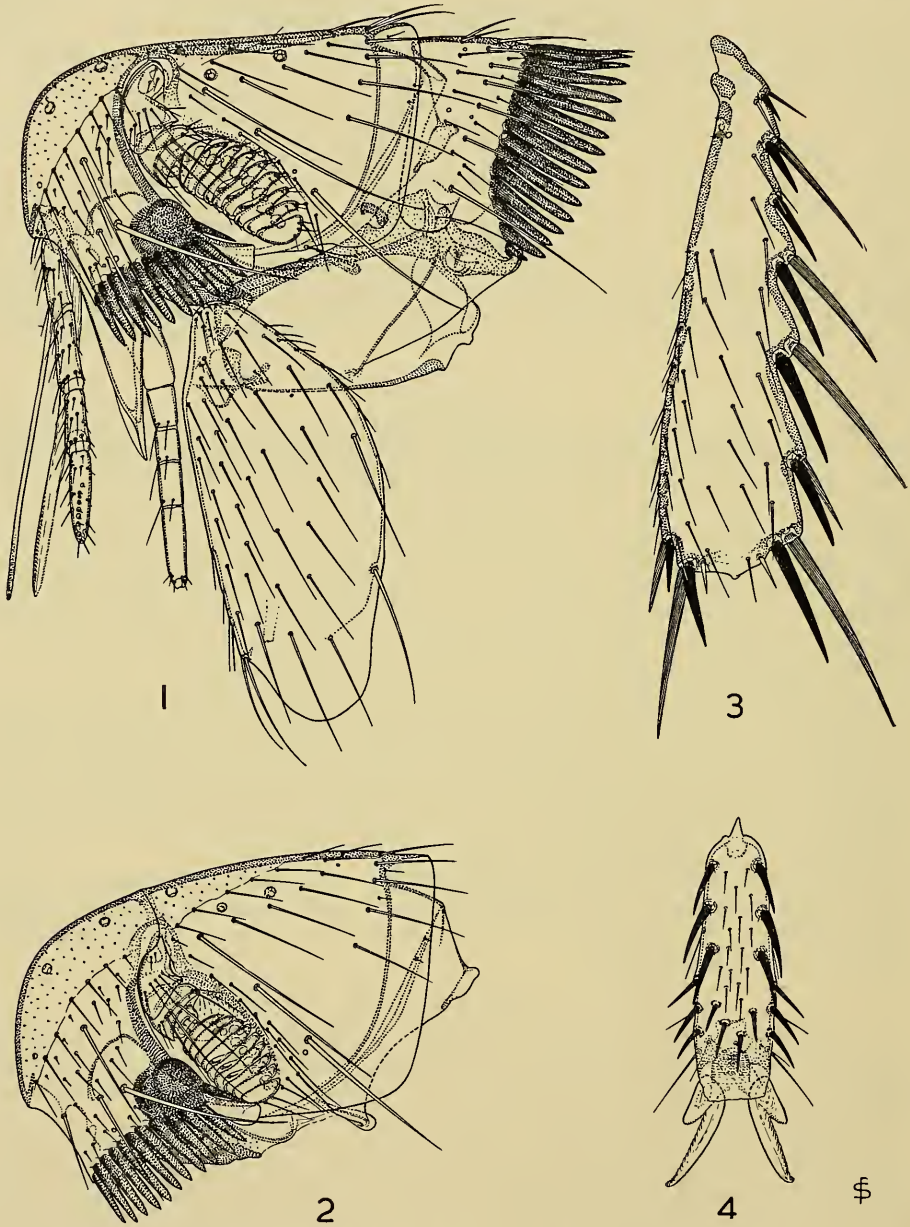
The genus *Hoogstraalia* is a very peculiar one. As pointed out by Traub, it differs from all other members of the Pygiopsyllidae by the presence of a genal ctenidium and of a sinus in the dorso-anterior margin of the prosternosome for the reception of one end of the first link-plate.

Hoogstraalia vandiemeni, sp. nov. (Figs. 1–10).

Type material: Male holotype, female allotype and one male paratype bred from a nest of the White-breasted Scrub-tit *Acanthornis magna*, collected on Mt. Wellington, Tasmania. The specimens are in the E. W. Ferguson collection, now housed in the School of Public Health and Tropical Medicine in Sydney.

Diagnosis: The new species is closely related to *Hoogstraalia turdella* Traub, hitherto the only known representative of the genus. The male differs from that of *H. turdella* by having a much more strongly convex frons, by the presence of fewer spines in the genal ctenidium (11 instead of 13) and more numerous setae on the nota and terga, by the different outline of the posterior margin of tergum VIII, the fixed process of the clasper is shorter and basally broader, the dorso-anterior margin of the movable process convex instead of slightly concave and also with a somewhat different chaetotaxy, the upper lobe of the bifid apical part of the distal arm of sternum IX is shorter and the anal segment differently shaped. No comparison of females can be given, since that sex of *H. turdella* is not yet known.

Description. Head (Figs. 1, 2): Fronto-clypeal margin strongly convex in the male, less so in the female. Oral margin concave. Anterior wall of frons rather narrow and of uniform width throughout. Submarginal frontal row consisting of



Text-figs. 1-4.—*Hoogstraalia vandiemeni*, sp. nov.: 1, Head, prothorax and fore coxa of male (paratype). 2, Head of female (allotype). 3, Hind tibia of female (allotype). 4, Fifth hind tarsal segment of female (allotype).

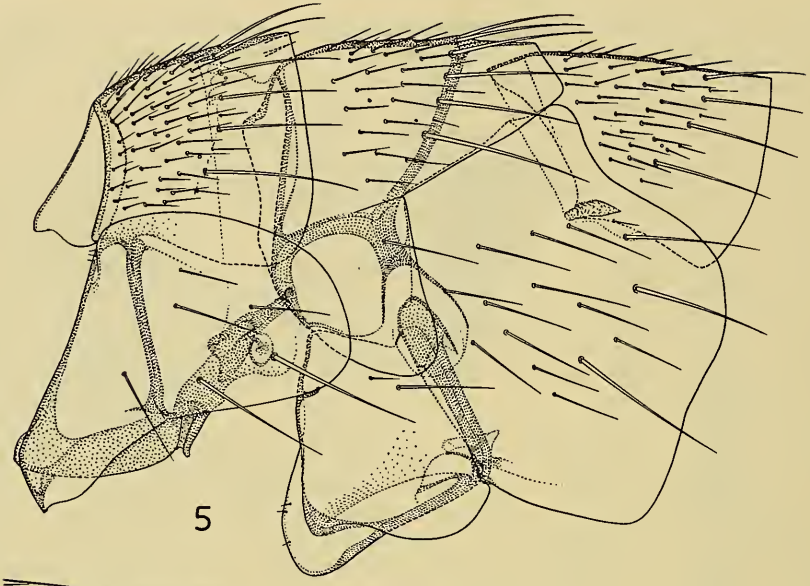
seven or eight slender setae. Ocular row of three setae, the long ocular seta placed well in front of the eye. Between the submarginal and ocular rows one large seta and a number of small and minute setae. The oblique genal ctenidium consists of 11 straight, fairly long and sharply pointed spines (in the female allotype there are 11 on

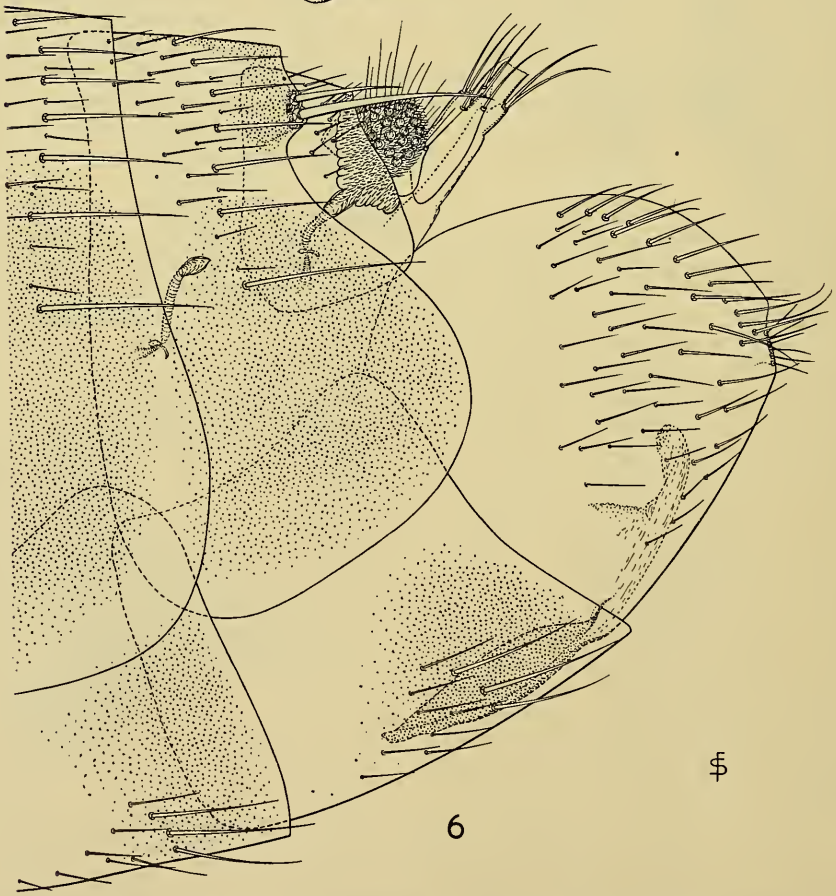
one side, 12 on the other); the uppermost of the genal spines is out of alignment with the others and is situated behind the eye and just above the dorsal margin of the genal process. The genal process has an obtuse apex. Eye large, not sinuate. Tentorial rod fully developed, running from a point below the apex of the antennal clava to just in front of the middle seta of the ocular row. The largest setae of the antennal pedicellus reach to nearly the middle of the clava in the male, to near the apex of the clava in the female. Antennal fossa closed, bordered dorsally by a number of thin setae. Postantennal region of head with three rows of setae, the first consisting of four to six, the second of five to seven, and the third of six setae. The occipital groove in the male is rather shallow. The apex of the maxillary palp reaches to about the middle of the fore coxa, while the tips of the epipharynx, of the finely serrated laciniae and of the five-segmented labial palps reach to about two-thirds the length of the fore coxa. In the female the interantennal suture is dorsally uninterrupted, but the portion of the head anterior to the suture does not overlap the hinder portion as in a true fracticipit head.

Thorax (Figs. 1, 5): Pronotum with two rows of setae, the first row consisting of six to nine setae, the second row of seven setae each side; pronotal ctenidium with 31–33 long and slender spines. Prosternosome with a sinus for the reception of one end of the first link-plate. Mesonotum with a main row of six setae each side, preceded by numerous small setae which are scattered all over the surface; two pseudosetae each side under the mesonotal collar near the dorsum. Mesepisternum much higher than long, with one seta; mesepimeron with four or five setae in the male, in the female with one seta on one side, three on the other. Metanotum with a main row of five to six setae each side, preceded by a number of smaller setae which form about three irregular rows; the large metepisternum with only one seta; metasternum with a squamulum and with one large and one or two minute lateral setae, metepimeron with 13–17 setae. Pleural arch of metathorax well developed, as are also the pleural rod and ridge.

Legs (Figs. 1, 3, 4): Fore coxa as in Figure 1. Mid coxa with an uninterrupted oblique pale suture on the outer side, without setae on the inner side but on the outer side with a patch of a dozen or more setae near the apical half of the anterior margin. Hind coxa with a patch of about thirty setae adjoining the apical two-thirds of the anterior margin, and a smaller group of small setae on the inner side near the apical third of the anterior margin. Fore femur on the outer side with about ten small lateral setae, several setae along the apical half of the dorsal margin and one larger seta near the ventral margin at proximal fourth; on the inner side only one small seta on the basal part. Mid femur with a ventral submarginal row of five to six small setae and a larger one near the apex. Hind femur with a ventral submarginal row of five to eight setae, of which the apical one is the largest. Fore and mid tibiae with six notches in the dorso-posterior margin, each notch bearing two setae (the outer of the two setae in the penultimate notch often shifted a little away from the notch onto the lateral surface). Hind tibia (Fig. 3) with seven notches in the dorso-posterior margin, bearing 2, 2, 1, 2, 2, 2 (sometimes 1) and 2 setae respectively from base to apex; on the outer lateral surface of the hind tibia about two dozen slender setae. None of the tarsal setae reaches beyond the apex of the next segment. Fifth tarsal segment (Fig. 4) of all legs with six pairs of lateral plantar setae, the three apical pairs consisting of rather small setae, and four subapical plantar setae except on the last segment of the fore tarsus which usually seems to bear only one such seta (on the fifth tarsal segment of one fore leg of the female allotype there are four subapical plantar setae); on the plantar surface there are also about 15 very small setae.

Abdomen: Main row of setae on terga I–VII in the male with 4, 8, 8 (9), 8 (7), 8 (9), 7 and 7 setae respectively on each side; in the female with 4, 8, 8, 7 or 8, 7 or 8, 7 and 4 setae. These rows are preceded by numerous smaller setae which may form three irregular rows. The most ventral seta of the main row on terga II–VII is inserted below the level of the spiracle. Terga II–V in the male with 3 (2), 2 (3), 1 (2) and 1 (0) short marginal spinelets each side near the dorsum; in the female the



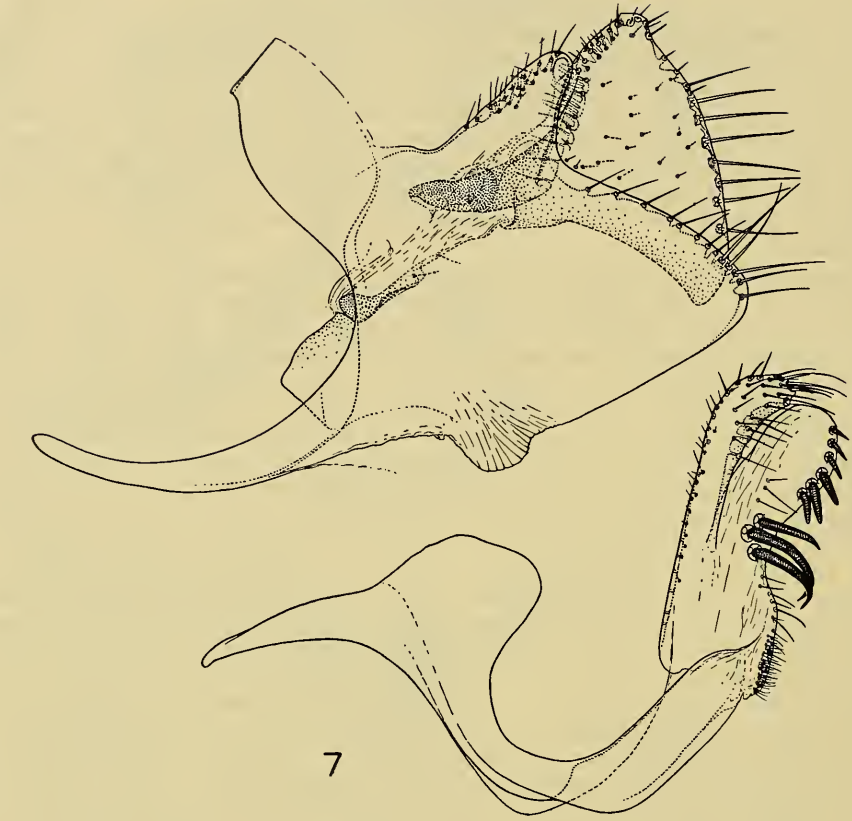


Text-figs. 5, 6.—*Hoogstraalia vandiemeni*, sp. nov.: 5, Mesothorax, metathorax and tergum I of male (paratype). 6, Terminal segments of male (holotype) with the omission of clasper and sternum IX.

numbers of spinelets on each side of terga II–V are 3, 2, 1 and 1 (on one side of tergum V of the only known female there is a spiniform seta instead of a normal spinelet). Tergum VII with two antesensilial setae each side in both sexes; in the male (Fig. 6) the upper seta is about half the length of the lower; in the female (Fig. 10) the upper seta is about two-fifths the length of the lower. Margin of tergum VII below the antesensilials markedly concave, especially in the female. Sternum II (basal abdominal sternum) in both sexes with one ventro-marginal seta each side, without setae on the lateral surface. Sterna III–VII in the male and III–VI in the female with a main row of four setae each side, the rows preceded by a group of smaller setae.

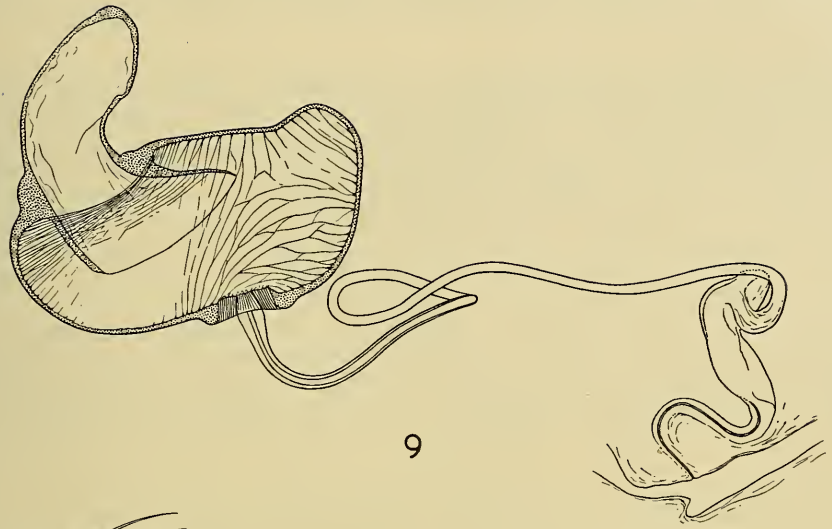
Modified abdominal segments and genitalia. Male (Figs. 6–8): Tergum VIII (Fig. 6) small, bearing anterior to the fairly large spiracular fossa about a dozen small setae, but no setae below the fossa. Sternum VIII (Fig. 6) large, the dorso-posterior margin smoothly rounded except for a portion, which includes a short ventro-posterior marginal row of about six thin setae, where the posterior margin is straight or feebly concave, the very marked angle present in *H. turdella* above this row of setae not developed in the present species. On the outer surface of sternum VIII are numerous smallish setae. As in *H. turdella*, the ventral margin of sternum VIII forms cephalad an elongate ellipsoid apodeme which protrudes deeply into the seventh sternum; an intersegmental membranous process extends caudad from the apodeme, dorsally joining up with the base of the distal arm of sternum IX. Fixed process of clasper (Fig. 7) sugarloaf-shaped, with a number of small setae on the inner side near the dorsal margin; its apex smoothly rounded and the sides much more divergent than in *H. turdella*. Along the posterior margin of the large corpus of the clasper, which projects strongly caudad, a row of about a dozen slender setae of which the lower five are markedly larger than the rest. Manubrium long and narrow, more strongly curved upwards than in *H. turdella*. Movable process of clasper (Fig. 7) large, triangular, with convex dorso-anterior and posterior margins; along the former margin numerous minute setae and along the latter margin a few small setae near the obtuse apex and farther downwards along the margin seven or eight fairly long ones. No setae on the outer lateral surface of the movable process, but on the inner surface scattered minute setae are present. Proximal arm of sternum IX (Fig. 7) greatly expanded apically, shaped like the head and neck of a curlew or ibis. Distal arm of sternum IX divided into an anterior non-setose part and an apical portion which is bifid in the apical half; the anterior (or dorsal) lobe of the bifid portion is narrow and bears a number of minute setae along the dorsal margin and many long or longish ones at and near the apex; the posterior (or ventral) lobe is nearly as long as the anterior, but is much broader, with a rounded apex, and bears on each side a row of six short spiniforms and proximad to these three large spiniforms which are apically curved, the two most proximal especially so. Proximad to the three large spiniforms are several small setae and a marginal dense patch of minute setae. Sensilium with 18 trichobothria each side. Anal segment long and rather narrow (see Fig. 6). Phallosome (Fig. 8) virtually as in *H. turdella*, described in detail by Traub.

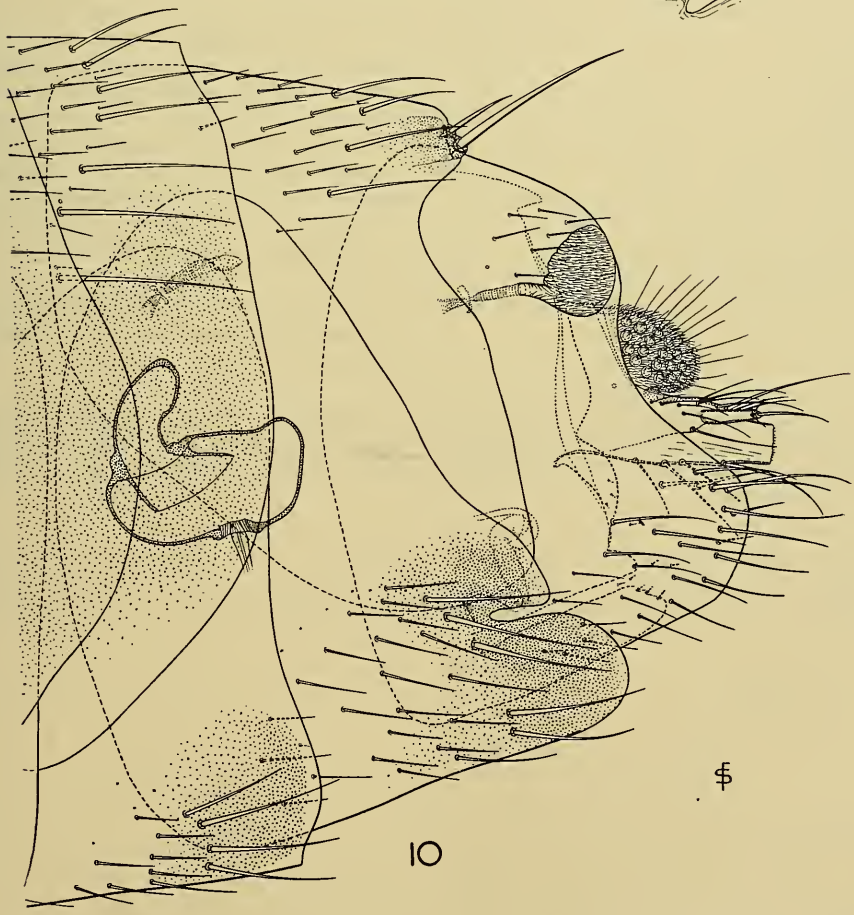
Female (Figs. 9, 10): Posterior margin of sternum VII (Fig. 10) with a deep and narrow lateral sinus dividing an oblique and blunt short dorsal lobe from a more rounded ventral lobe which extends farther caudad than the dorsal lobe, the whole of the ventral lobe and most of the dorsal one strongly sclerotized; the sternum with a main row of five setae each side, preceded by numerous smaller setae which are not arranged in rows. Upper portion of tergum VIII without setae below the large spiracular fossa but with a group of seven short setae anterior to it; on the lower part of tergum VIII about a score of setae, of which the posterior and more dorsal ones are the largest. Four normal-sized genital setae on the inner side of tergum VIII, and anterior to these several minute ones. Sternum VIII not much sclerotized, with a few minute setae at the blunt apex. Sensilium strongly convex, with 18 trichobothria each side. Anal tergum with a number of slender setae; anal stylet four times as long as broad, with one apical seta which is only a little longer than the



Text-figs. 7, 8.—*Hoogstraalia vandiemeni*, sp. nov.: 7, Clasper and sternum IX (holotype). 8, Phallosome (holotype).

stylet, and two short preapical setae. Anal sternum with a markedly straight ventral margin, along which are placed four longish setae. Ductus bursae (Fig. 9) forming a double bend; bursa copulatrix rather long and fairly broad; no ductus obturatus; ductus spermathecae not very long, only just over twice as long as the bulga of the spermatheca. Spermatheca (Fig. 9) with a trapezoid bulga, the dorso-posterior angle





Text-figs. 9, 10.—*Hoogstraalia vandiemeni*, sp. nov.: 9, Genital ducts and spermatheca (allotype). 10, Terminalia and spermatheca (allotype).

of which forms a distinct hump; the hilla rather short and strongly curved, the portion of it which protrudes deeply into the bulga about twice as wide as the free portion.

Length: ♂, 2¾–3 mm., ♀, 3 mm.

Remarks: The only known specimen of *Hoogstraalia turdella* Traub was collected from the body of a thrush (*Turdus poliocephalus kelleri* Mearns), taken at an altitude of 7800 feet on Mt. McKinley on Mindanao, Philippine Islands. Traub (1951) suggested on the basis of the large number of pronotal spines that *H. turdella* is a true bird-flea; his suggestion has been confirmed by the discovery of the species described above as *H. vandiemeni*, the specimens of which were bred from the nest of the White-breasted Scrub-tit (*Acanthornis magna* Gould), which occurs only in Tasmania. This bird, a member of the family Muscicapidae (primitive insect eaters), subfamily Malurinae (Australian Warblers), makes a large globular nest, with a side entrance, in thick bush, from a few inches to nine feet or higher above the ground. *Turdus poliocephalus kelleri*, which according to Mayr and Amadon (1951) also belongs to the Muscicapidae (subfamily Turdinae), makes a typically thrush-like open nest; this subspecies is confined to Mindanao. It is of course by no means certain that the scrub-tit is the only host of *H. vandiemeni*. Moreover, it is very probable that representatives of *Hoogstraalia* will be found in birds' nests in other parts of Australia (perhaps only at particular altitudes) and in the islands to the north, up to the Philippines.

Traub mentions in the description of the genus *Hoogstraalia*, and also in that of the species *H. turdella*, that the movable process bears spiniform setae, and in the holotype of *H. vandiemeni* it would be extremely easy to think that this was their position, since in this specimen the movable process and the distal arm of sternum IX overlap just as in the holotype of *H. turdella*. But the fortunate chance that in the paratype of *H. vandiemeni* the distal arm of sternum IX is slightly further removed from the movable process has enabled me to ascertain that actually these spiniforms are not on the movable process but on the distal arm of sternum IX. The resemblance in the male terminalia of the two species is so close as to make it certain that the three long spiniforms in *H. turdella* must also be placed on sternum IX, just proximad of the shorter spiniforms on this structure.

To the generic description of *Hoogstraalia* should be added that the tentorial rod is fully developed and that the female also has two antesensilial setae; the statement about the shortness of the setae of the antennal pedicel should be omitted as it does not apply to *H. vandiemeni*.

In spite of considerable morphological modifications which doubtless arose in response to the nature of the host-associations of these fleas, the genus *Hoogstraalia* shows clearly affinities with *Acanthopsylla*, a genus of fleas known only from Australia and New Guinea.

References.

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Traub, R., 1951.—*Hoogstraalia turdella*, a new genus and species of flea from the Philippines. *Proc. ent. Soc. Wash.*, 53: 97-104.